

**What is claimed is:**

1. An input device with a multi-directional scrolling wheel, comprising:
  - a housing;
  - a carrier pivotally supported within the housing;
  - 5 a wheel with a first axle rotatably supported within the carrier;
  - an extended axle for pivotally mounting the carrier;
  - a device for detecting rotation of the extended axle in response to tilting of the carrier; and
  - a second device for detecting rotation of the first axle;
- 10 wherein the wheel is arranged to be freely rotated so as to scroll an image in a Y-axis direction,
  - wherein the carrier is arranged to be tilted left and right so as to scroll the image in an X-axis direction, and
  - 15 wherein the second device is an encoder coupled to the first axle and positioned outside the carrier.
2. The input device as claimed in claim 1, wherein the first device is a first encoder coupled to the extended axle and located outside of the carrier for detecting rotation of the extended axle that results from tilting of the carrier.
- 20 3. The input device as claimed in claim 2, wherein the first device is a potentiometer.
- 25 4. The input device as claimed in claim 1, wherein the second device is a potentiometer.
5. The input device as claimed in claim 1, wherein the extended axle of the carrier is perpendicular to the axle of the wheel.
- 30 6. The input device as claimed in claim 1, wherein the extended axle is arranged to activate a microswitch positioned below the extended axle when

the wheel is pressed in a vertical direction to cause corresponding vertical movement of the extended axle.

7. The input device as claimed in claim 1, wherein the first device includes microswitches positioned on opposite sides of a downwardly extending portion of the extended axle, said microswitches being arranged to detect rotation of the extended axle resulting from tilting of the wheel.
8. The input device as claimed in claim 1, wherein a retaining unit is located within the housing to maintain the carrier in a non-tilted position.
9. The input device as claimed in claim 8, wherein the retaining unit is made of a flexible material.
10. The input device as claimed in claim 1, wherein the first axle is arranged to activate a micro switch located outside of the carrier when the wheel is pressed in a downward direction.
11. The input device as claimed in claim 1, wherein the wheel has an inner wheel and an outer wheel; and the outer wheel is arranged to tilt relative to the inner wheel in order to tilt the carrier, a resulting movement of the extended axle being detected to cause said scrolling in the X-axis direction.
12. The input device as claimed in claim 11, wherein a periphery of inner wheel at least has a first retaining portion, and a periphery of the outer wheel correspondingly has at least a second retaining portion; the first retaining portion allowing a tilting movement of the second retaining portion.
13. The input device as claimed in claim 12, wherein the first retaining portion is a recess, and the second retaining portion is a protrusion.